DOCUMENT RESUME

ED 280 920 UD 025 422

TITLE	Chapter 1/P.S.E.N. Remedial Reading and Math, 1984-85. OEA Evaluation Report.
INSTITUTION	New York City Board of Education, Brooklyn. Office of Educational Assessment.
PUB DATE	Nov 86
NOTE	45p.; Prepared by the O.E.A. Special Education Evaluation Unit.
AVAILABLE FROM	Office of Educational Assessment, New York City Board of Education, 110 Livingston St., Brooklyn, NY 11201.
PUB TYPE	Reports - Evaluative/Feasibility (142)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	Bilingual Education Programs; Elementary Secondary Education; *Individual Instruction; *Mathematics Instruction; Program Effectiveness; *Program Implementation; *Reading Instruction; *Remedial Programs; Special Education; Staff Development; Urban Education
IDENTIFIERS	*New York (New York)

ABSTRACT

The 1984-85 Individualized Reading and Math Services Program in New York City provided supplementary remedial reading and mathematics instruction to eligible students in public and non-public schools. Students received individualized instruction from a remediation team consisting of a program teacher and a special education classroom teacher. The remedial team used a holistic, meaning-centered approach to reading, while math instruction stressed word problems and practical skills. The program served a total of 13,175 students in 225 community, special, and non-public schools. An evaluation of the program's implementation and outcome indicated that the program was satisfactorily implemented and effectively promoted student achievement gains in reading and math. A total of 241 students were in bilingual classes. Of these, 103 received remedial reading instruction in Spanish. Achievement test results indicate that program objectives for bilingual program students were not met in reading, but they were met in math. Recommendations for the future include: (1) lower program eligibility age from 9 to 7; (2) strengthen the assessment process for low functioning readers; (3) eliminate or simplify the use of daily prescriptive logs in order to make more time available for instruction; (4) acquire more instructional materials; and (5) provide additional staff development and parent involvement activities. (KH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED260720

CHAPTER 1/P.S.E.N.
REMEDIAL READING AND MATH
1984-35

OEA Evaluation Report

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Dr Richard Gottenberg
NYC Board of Ed

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

Minor changes have been made to improve reproduction quality.

Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Evaluation Section Report
Robert Tobias, Administrator
Judith Torres, Senior Manager

November, 1986

CHAPTER 1/P.S.E.N.
REMEDIAL READING AND MATH
1984-85

Prepared by the O.E.A.
Special Education Evaluation Unit

Ronald C. Miller,
Evaluation Manager

Tomi D. Berney,
Evaluation Specialist

David Nemiroff,
Michael Greeley, and
Lynn Mulkey,
Evaluation Consultants

New York City Public Schools
Office of Educational Assessment
Richard Guttenberg, Director

It is the policy of the Board of Education not to discriminate on the basis of race, creed, national origin, age, handicapping condition, sexual orientation, or sex, in its educational programs, activities, and employment policies, as required by law. Any person who believes he or she has been discriminated against should contact: Carole Guerra, Local Equal Opportunity Coordinator, Office of Educational Assessment, 110 Livingston Street, Room 743, Brooklyn, New York 11201. Inquiries regarding compliance with appropriate laws may also be directed to: Mercedes A. Nesfield, Director, Office of Equal Opportunity, 110 Livingston Street, Room 601, Brooklyn, New York; or the Director, Office of Civil Rights, U.S. Department of Education, 26 Federal Plaza, Room 33-130, New York, New York 10278.

SUMMARY

The 1984-85 Chapter 1/P.S.E.N. Individualized Reading and Math Services Program, operated by the Division of Special Education (D.S.E.), provided supplementary remedial reading and math instruction to eligible students in public and non-public schools. Students received individualized instruction from a remediation team consisting of a program teacher and a special education classroom teacher. The remedial team used a holistic, meaning-centered, approach to reading, emphasizing the integration of students' personal experiences with reading and writing. In math, instruction stressed word problems and practical skills.

The program served a total of 13,175 students in 225 community, special, and non-public schools. Of the total program population, 11,293 attended regional programs, including 241 in classes for those with limited English proficiency (LEP); 1,653 attended low incidence programs operated by the Office of Citywide Programs; and 229 were in non-public schools.

The Office of Educational Assessment (O.E.A.) conducted an evaluation of the program's implementation and outcome by visiting a representative number of program sites to collect data through observations, staff interviews, and review of records. Results indicated that the program was satisfactorily implemented and effectively promoted student achievement gains in reading and mathematics.

O.E.A. found that teachers at approximately three-quarters of the sites visited used a holistic approach to reading instruction, which represented a substantial increase from the previous cycle; they integrated reading instruction and adaptive skill development with word problems and emphasized practical skills in mathematics instruction. In addition, they used a wide variety of effective instructional materials. Staff development for program teachers continued to be excellent; training of classroom teachers, however, needs to be augmented.

In reading, the program achievement objective for English-speaking students was that 75 percent would demonstrate normal curve equivalent (N.C.E.) gains between pre-test and post-test results as measured by the Metropolitan Achievement Test (M.A.T.). N.C.E. gains indicate that participants show a greater increase in achievement than would be expected from non-participants making normal progress from the beginning to the end of the school year. This was the first year the M.A.T. was used. Of the 7,741 students with pre- and post-test scores (96 percent of those served for the full year), 58.5 percent showed an N.C.E. gain, indicating that the program objective had not been met. Despite this fact, it is important to note that the program was still effective in promoting student achievement in reading. The mean N.C.E. gain was 4.7 points representing a statistically significant ($p<.01$) improvement during the instructional year.

A total of 241 students were in bilingual classes. Of these, 103 students received remedial reading instruction in Spanish and were tested throughout the year with the Leamos Spanish Developmental Reading Program, an individualized criterion-referenced test. The program achievement objectives for this group were that 80 percent would master two or more new skills per 20 sessions attended, and that 30 percent would master five or more new skills per 20 sessions attended. An analysis of the results indicated that 61 percent mastered at least two new skills each 20 sessions, and that six percent mastered five new skills after 20 days attendance. Therefore, neither objective was accomplished.

In math, the program achievement objectives were that 80 percent of the students would master new math skills at a rate of two or more skills per 20 sessions attended; and that 30 percent would show mastery rates of five or more skills per 20 sessions attended. Achievement was measured by ongoing administration of the Individualized Criterion Referenced Test. Analysis of results for 1,982 students indicated that both achievement ojectives were reached: 91 percent showed a mastery rate of at least two skills per 20 sessions attended, and 37 percent mastered at least five skills per 20 sessions attended. The overall mean mastery rate was 4.7 (S.D.=4.6).

The following recommendations are offered to strengthen the program:

- Student selection criteria: In order to prevent more effectively the development of later academic difficulties, lower the program eligibility age from nine to seven years;

- Student assessment: Strengthen the assessment process for low functioning readers by using the Metropolitan Achievement Test Primer level; carefully choose the test level to be administered to each participant to assure the ability to discriminate student achievement well.

- Recordkeeping: Eliminate or simplify the use of daily prescriptive logs in order to make more time available for instruction.

- Instructional materials: Acquire more English and Spanish library books, consumable items, high-interest low-level materials, audio-visual aids such as tape read-alongs, and concrete-manipulative materials.

- Staff development: Provide additional pre-service and in-service training for special education classroom teachers through the use of the whole-class model, demonstration lessons, and on-site workshops; for program teachers, offer additional training in bilingual instruction, math instruction, behavior modification, and adaptive skill development; offer periodic staff development opportunities to program

coordinators and assistant coordinators through the monthly coordinators' meetings.

- Parent education and involvement: Continue to explore innovative methods for expanding parent involvement in the program, including integrating parent meetings with other school or regional activities (e.g. student awards assemblies).

ACKNOWLEDGEMENTS

A number of other people contributed to this evaluation effort in addition to the authors listed on the title page. We are grateful to Susan Green who not only served as a field consultant but also assisted in analyzing the data, as did Diana Feit and Joan Chen. Other field consultants were Justine Eisenberg, Ann Saltzman, and Imogene Parker. We also thank Dina McClellan for her editing, and we appreciate the typing efforts of Denise Evans.

TABLE OF CONTENTS

		PAGE
I.	INTRODUCTION	1
II.	METHODOLOGY	7
III.	EVALUATION FINDINGS	9
IV.	CONCLUSIONS AND RECOMMENDATIONS	34

LIST OF TABLES AND FIGURE

TABLES		PAGE
TABLE 1:	Chapter 1/P.S.E.N. Sessions Scheduled and Attended, by Program Component	19
TABLE 2:	Student N.C.E. Gains in Reading by Test Level	20
TABLE 3:	Signficance and Effect Size of N.C.E. Gains in Reading by Test Level	23
TABLE 4:	Percentage of English-Speaking Public School Students Showing N.C.E. Gains in Reading by School Level	24
TABLE 5:	Significance and Effect Size of N.C.E. Gains in Reading by School Level	25
TABLE 6:	Frequency Distribution of Mastery Rates of Leamos Skills	27
TABLE 7:	Frequency Distribution of Total Leamos Skills Mastered	28
TABLE 8:	Frequency Distribution of Mastery Rates of Math Skills	30
TABLE 9:	Frequency Distribution of Total Math Skills Mastered	31

FIGURE

FIGURE 1:	Percentage of Math Skills Mastered by I.C.R.T. Skill Area Among All Math Students	32

I. INTRODUCTION

During the 1984-85 school year the Division of Special Education (D.S.E.) administered the Chapter 1/P.S.E.N. Individualized Reading and Math Services Program. Its goal was to provide supplementary remedial reading and math instruction to eligible students in public and non-public schools in the five boroughs. A remediation team, consisting of a program teacher and a special education classroom teacher, instructed the students. During this transitional year in which program staff began to more fully implement a holistic, meaning-centered approach to reading instruction, they also continued to emphasize the integration of the students' personal experiences with reading and writing. In math, teachers stressed word problems and practical skills.

The program provided remedial services to 13,175 students in 225 community, special, and non-public schools. Within the total population, 11,293 students attended regional programs (including 241 students in classes for those with limited English proficiency [LEP]), 1,653 students were enrolled in low incidence programs in the Citywide Services Unit, and 229 students attended non-public schools. A total of 10,723 students (84 percent of the total) received instruction in reading alone; 1,391 students (13 percent) received instruction in both reading and math; 324 (three percent) received instruction in math alone.

PROGRAM DESCRIPTION

Adminstration and Staff

The D.S.E. Reimbursable Programs Unit administered the Chapter 1/P.S.E.N. program through a program manager and field-level coordin-

ators in the five D.S.E. regions and Citywide Services Unit. The program manager was responsible for coordinating program activities, monitoring record-keeping, acting as O.E.A. liaison, assisting in data collection, acting as liaison with D.S.E. budget office, presenting the program to the Parent Advisory Council, and coordinating the six program coordinators.

The five regions and Citywide Services were responsible for the implementation of the program. The coordinators had responsibility for the day-to-day operation of the program, including overall coordination of services, staff recruitment and development, ordering and distributing materials, maintaining records, and coordinating parent activities. Assistant coordinators were responsible for providing training and assistance to both program teachers and participating classroom teachers. Program and classroom teachers were responsible for remedial instruction.

PROGRAM COMPONENTS

The program consisted of two components: a reading-only component operated at 185 sites; a reading-and-math component operated at 45 sites.

Public schools employed a whole-class model of instruction in both components. This method had the purpose of retaining class integrity, facilitating the integration of remedial and basic instruction, and providing training to special education classroom teachers. Most sites used the pull-out-to-lab whole-class model, in which the special education classroom teacher and the entire class joined the Chapter 1

teacher in the program laboratory. A few schools used a traveling lab model, in which the program teacher traveled to different special education classrooms.

The reading component included all seven non-public schools. These sites used an individual or small-group pull-out model in which students received remedial instruction outside their classrooms for a minimum of 90 minutes per week.

The intensity of service and number of classes served varied by program component. At the reading-only sites, the program teacher worked with four, five, or six tax-levy classroom teachers and their classes, each for either four or five periods per week. At nearly all the reading-and-math schools, the remediation teacher worked with four classroom teachers for three periods per week in reading and three periods per week in math. Depending on student eligibility and need, some students received only math.

TARGET POPULATION

English-Speaking Public School Population

English-speaking public school students constituted the largest subgroup in the program. The two program components served a total of 12,705 students. A total of 8,145 students participated for the full year and 2,032 participated for only the fall term. They did not complete the spring term because of transfer out of the program. An additional 2,528 students were late entries into the program, participating only in the spring term.

The regional distribution of students served was as follows: 22

percent were in Brooklyn East/Staten Island, 18 percent in the Bronx, 17 percent in Queens, 16 percent in Brooklyn West and 14 percent in Manhattan. Thirteen percent of the students attended citywide programs.

Almost 50 percent of these students attended elementary schools, 20.3 percent were at the intermediate level, 24.8 percent in junior high schools, and 5.3 percent attended high schools.

Their age range was from six to 21 with a mean of 12.4 years. The largest number of students, 4,847 or 47 percent of the target population, were in the 11 to 13 year-old age range.

Transition from 200.14 classification based on handicapping condition to 200.6 classification based on functional grouping occurred during 1984-85. Accordingly, the distribution of program service categories reflected both systems: 8,897 students were classified under 200.14 while 3,808 were classified under 200.6.

Among the students grouped according to 200.14 categorization, 61 percent were in Health Conservation (H.C. 30) classes for the learning disabled, 20 percent were in classes for the Emotionally Handicapped (E.H.), eight percent were in classes for the Neurologically Impaired and Emotionally Handicapped (N.I.E.H.), six percent were in the program for Speech, Language, and Hearing Impaired Children (S.L.H.I.C.), and three percent were in classes for the Educable Mentally Retarded (E.M.R.). The remaining two percent of the students were in classes for the orthopedically impaired (H.C. 10), classes for students with other physical impairments, and classes for the multiple-handicapped. Within the 200.6 categories, 77 percent of the students were in Modified

Instructional Services I (MIS I) classes, 22 percent were in MIS II classes, and one percent were in Specialized Instructional Environment VIII (S.I.E. VIII) programs.

Limited English Proficiency (LEP) Public School Population

Two hundred forty-one LEP students at five sites, three in Manhattan and two in the Bronx, received instruction in reading; 185 students participated for the full year; 56 students participated for less than a full academic year. Eighty-nine percent of the LEP students attended elementary schools, eight percent were in intermediate schools, and three percent attended junior high schools. The age range for LEP students was from eight to 13 years with a mean of 9.1 (S.D.=1.1). Most students (85.3 percent) were served in bilingual Health Conservation (H.C.-30) classes, 8.2 percent in bilingual Educable Mentally Retarded (E.M.R.) classes, and 6.5 percent in bilingual Neurologically Impaired Emotionally Handicapped (N.I.E.H.) classes.

Non-public School Population

Eligible non-public school students (a total of 229) received remedial reading instruction through the Citywide Services program. One hundred fifty three received services for the full year, 55 for the fall only, and 21 for the spring only. These students had an age range of six to 19 years with a mean of 11.2 years (S.D.=2.8). Forty-eight percent attended elementary schools, 31 percent were in middle schools, and 21 percent attended high schools. The distribution of this group by

special education program was as follows: E.H., 46 percent; Learning Disabled, 17 percent; E.M.R., 17 percent; N.I.E.H., 14 percent; Deaf, six percent.

REPORT FORMAT

The report is organized as follows: Chapter II describes the methodology; Chapter III presents the findings on program implementation and outcomes; Chapter IV offers conclusions and recommendations.

II. EVALUATION METHODOLOGY

O.E.A. used a variety of techniques to assess program implementation and outcomes. To evaluate the level and quality of program implementation, field consultants observed instruction, reviewed program and student records, and interviewed staff and students at 51 program sites (approximately 20 percent). Sampling took into account the region, district, school level, component offered, and number of students in each program service category.

Field consultants interviewed 51 program teachers, 48 special education classroom teachers, 35 school-level administrators (principals, special education site supervisors, and unit teachers) and 21 students. In addition, they conducted interviews with all program coordinators and nine assistant coordinators. They attended and observed six staff development and three parent workshops. Consultants recorded implementation data on interview and observation schedules developed by the Office of Educational Assessment (O.E.A.). Interviews and observations focussed on: physical facilities, instructional approaches and records, materials and supplies, planning and staff collaboration, staff training, and parent education.

To evaluate program outcomes, O.E.A. staff conducted analyses of student attendance and achievement. They assessed achievement in reading for students instructed in English by analyzing pre- to post-test differences on the Metropolitan Achievement Test, Survey Edition, a norm-referenced test of reading comprehension. They assessed achievement in reading for students instructed in Spanish by analyzing the

number and rate of specific skills mastered, as measured by the Leamos Spanish Developmental Reading Program, an individualized criterion-referenced test. O.E.A. evaluated math achievement by analyzing the number and rate of specific skills mastered, as measured by ongoing administration of the Mathematics Individualized Criterion Referenced Test (I.C.R.T.). Program teachers reported achievement and attendance data on O.E.A.-developed data retrieval forms.

III. EVALUATION FINDINGS

PROGRAM IMPLEMENTATION

Physical Facilities

At most of the 51 sites visited, physical facilities supporting the program were excellent. Forty-one of the schools had separate program laboratories; most of these rooms were well-organized, spacious, and attractively decorated with movable furniture and materials readily accessible. Lighting and ventilation ranged from good to excellent. At five sites, program teachers and special education classroom teachers noted that laboratories were too small for instruction and the storage of necessary supplies. The teachers indicated that the small size of rooms made it difficult to group students appropriately.

Reading Instruction

Assessment. Program staff conducted a formal student assessment by administering the M.A.T. in reading for program students receiving instruction in English, and the Leamos for LEP students receiving reading instruction in Spanish. In addition, program teachers supplemented formal testing with informal reading and math inventories, personal observations and judgments, and input from classroom teachers.

O.E.A. asked program staff, participating teachers, and school administrators to assess the usefulness of the Reading M.A.T. for instructional planning. Most considered the instrument effective and had no reservations about its utility. Strengths of the test included the following: rapid and accurate assessment of specific strengths and weaknesses; use as both a criterion-referenced and norm-referenced

instrument; provision of grouping information on students' functional level; use in planning instruction in vocabulary and comprehension; and assistance in writing short-term instructional objectives. Among reservations voiced about the test were claims that it was not sufficiently specific for individualized planning; it took too long to administer and score; and it was less suitable for low-functioning readers or deaf students. Several program teachers recommended that the Primer level be used, claiming that the Primary 1 level was too difficult for some of their students.

O.E.A. interviewed program and school staff at the five sites where LEP students were served about the usefulness of Leamos. Some respondents found the test adequate, but several indicated that because it only tapped specific skills, it was not an appropriate instrument for a holistic approach to instruction. Some respondents also indicated that it was not suitable for low-functioning readers.

Instructional Activities. O.E.A. field staff observed the use of a holistic reading approach at 75 percent of the sites visited. This percentage was higher than in the previous cycle, when approximately 50 percent of the teachers were observed using this approach.

The most common type of holistic instruction observed was the whole-class reading lesson. This lesson consisted of three stages: an introduction, the main part of the lesson, and a follow-up activity. In the introductory stage, the teacher introduced vocabulary and initiated a discussion about the topic of the lesson. Often the discussion included descriptions of students' personal experiences which were relevant to the story about to be read. During the second or main

stage, actual reading occurred, either orally or silently. In the follow-up stage, teachers asked comprehension questions, provided reinforcement, and initiated additional activities including creative writing exercises and experiential discussions. The following observation illustrates this procedure.

> In one classroom, the lesson that involved a story called "Sam and His Dog." The teacher first made a list of animals on the board and asked students which of the animals could be pets; students had an opportunity to talk about their own pets or pets they would like to have; the teacher then listed new vocabulary words the students would need to read in the story; the students became familiar with the words and their meanings. Next the teacher gave a brief overview of the story and reminded children to think of their own experiences while they read it. The students read the story silently. A classroom discussion followed, after which the teacher distributed comprehension questions for the children to answer. Finally, the students wrote a short essay about the story.

In lessons emphasizing specific skills, teachers concentrated on one or more discrete topics, either in a small group or individual context. Skills taught were comprehension, vocabulary, word analysis, or phonics. The most commonly observed skill-based lessons were in comprehension and involved "finding the main idea," "reading for detail," or inference questions.

Most of the 21 students interviewed said they liked reading more this year than in previous years, and that the program had helped them read better. Some gave reasons for this improvement, including that they now "know the words better" than they did before. Many children also said they liked to read more in their spare time. Several said they went to the library more often than they did in the past. When students were asked about the kind of reading material they liked to

read in their spare time, about three-fourths mentioned story books and comic books; about one-third mentioned newspapers and magazines. The most popular were books about sports, science, or adventure; superhero books; sports magazines; and newspapers such as the Daily News.

Most program staff supported the transition to a holistic approach. They viewed the development of language through the method of building listening, speaking, and writing skills as being especially useful. They also liked using students' drawings as illustrations of their personal experiences. Several program and classroom teachers, program coordinators, and school administrators indicated, however, that this approach resulted in some loss of individualization of instruction, especially among low-functioning readers.

Materials and Supplies. Implementation of the reading program called for the distribution and use of a wide variety of instructional materials, including multisensory items. In the English-language reading program, consultants observed many different independent readers, workbooks, skillbooks, and teacher-made materials (the most popular of which seemed to be vocabulary flashcards), along with an assortment of other materials and supplies, including the blackboard, maps, globes, newspapers, and audiovisual materials (e.g. tape recorders). The most frequently documented commercial materials were Scholastic Sprint, Barnell-Loft Skill Series, and Readers Digest Skillbuilders. In the bilingual program, observers most frequently noted the presence of Leamos workbooks, Effective Writing Skills (Schaffer Publications), and A Pig Can Jig (Scholastic). Student journals, arts and crafts mat-

erials, and experience charts were among the other materials and supplies noted by the consultants at both English-only and bilingual sites. Most program and school staff members reported that they found the quality and quantity of materials in the program acceptable and suitable to the needs of the students. Some program personnel, however, expressed an interest in using more consumable materials, Spanish and English library books, and high-interest low-level materials. Others commented on the need for more audio-visual (e.g., tape read-alongs) and multi-sensory reading materials.

Math Instruction

Assessment. Program teachers carried out formal testing in math through the use of the Math I.C.R.T. Full pre-tests were administered in the fall for all math students, and progress was documented during the year by brief assessment updates (benchmarks) on new skills taught. As in reading, informal assessment supplemented formal testing. Program and school staff members reported that the I.C.R.T. was useful for instructional planning in math because it provided specific diagnostic-prescriptive information on student strengths and weaknesses.

Instructional Activities. Field consultants documented math instruction, classifying the lessons into one or more of the six I.C.R.T. skill areas (whole number operations, fractions, geometry, measurement, decimals/percent, and special topics). Approximately one-third of the lessons covered special topics (e.g. money, Roman numerals, telling time, using calendars and graphs). Measurement and fractions constituted about 15 percent of all lessons, and the remainder involved deci-

mals/percent and geometry. In most of the lessons observed, teachers integrated reading with math instruction, often through the use of word problems with an emphasis on practical skills. For example, in several lessons involving money, students read menus or price lists from local restaurants or supermarkets and performed basic arithmetic calculations. A lesson on cooking and measurement consisted of reading a recipe and then measuring the ingredients with measuring utensils.

Most students said they liked the math instruction and that math was a little easier this year than last. A few elaborated, saying they had improved in arithmetic by solving word problems. When queried on specific skills they had learned, a number said that when they buy things they now know the amount of change they should get in return.

Program and school staff members generally endorsed the reading and math component of the program, and most said that this, the second cycle was more effective than the first. They strongly supported the emphasis on computational skills, word problems, and practical skills; most respondents favored continuing this orientation in the next cycle.

Materials. As in reading, field consultants observed teachers using a wide variety of math materials. Abstract and representational items noted frequently included books such as Problem Solving in Math (Modern Curriculum Press) and Spotlight on Math (Jovanovich), kits such as the D.L.M. Word Problem Kit, and rexographed teacher-made materials that included computational exercises and word problems. Concrete manipulative materials included Cuisinaire rods, Unifix cubes, play money, clocks, rulers and math games. Program and school staff members were

were generally satisfied with the quantity, quality, and variety of math materials, finding them consistent with the math curriculum. Several pointed out, however, the continued need for concrete-manipulative items.

Recordkeeping

O.E.A. consultants inspected teacher records and concluded that the staff had done an excellent job maintaining them. When asked about records at non-sample sites, program coordinators reported that recordkeeping was efficient and up-to-date at those schools as well. Twelve program teachers told consultants that recordkeeping and other paperwork was excessive, and significantly reduced teaching time, especially because paraprofessionals were no longer available to assist with this task. Specifically, nine teachers claimed that the prescriptive logs asked for the same information as their lesson plans; accordingly they recommended that the logs be simplified or eliminated.

Staff Collaboration and Utilization

A cornerstone of the whole-class model was effective collaboration between program and classroom teachers. Field consultants observed that at most sites the two teachers worked together effectively; at some, however, the tax levy teacher appeared to be underutilized, especially during whole-class lessons given by program teachers. Most teachers reported that they planned effectively with their colleagues both for individual students and the entire class. Both program and tax levy teachers requested more time for collaborative meetings during common preparation periods.

Staff Development

An important goal of the program was to provide training to both program and classroom teachers. Program coordinators organized monthly staff development workshops for, and arranged for individual consultation with, program teachers. Methods for implementing staff training of classroom teachers included on-site workshops given by Chapter 1 program staff, informal consultation between program and classroom teachers, and demonstration lessons given by program teachers in the classroom.

Program staff reported that they were satisfied with their training. Most coordinators, assistant coordinators, school administrators, and program teachers considered the monthly workshops highly effective in meeting their needs. This view was corroborated by O.E.A. staff members who observed several workshops. In addition, on-site staff development was also rated highly by program teachers. There were, however, some recommendations for improvement. First, five of the 18 reading and math teachers interviewed requested that additional math workshops be offered. Second, a number of program staff recommended that the following topics be given more emphasis in the monthly workshops: techniques for teaching writing, math instruction, use of behavior modification, adaptive skill development, and instruction of LEP students.

The evaluation of the previous cycle had recommended additional training of special education classroom teachers. Most staff interviewed reported that progress along these lines had been made. Finally, program coordinators recommended that they receive formal staff development from outside speakers. They emphasized that the value of this

innovation would be substantial because of its turnkey effect.

O.E.A. directly asked classroom teachers what they needed help with most, they mentioned the following: interpretation and use of M.A.T. test results for lesson planning, methods for grouping their students, strategies for working with low-functioning readers, and use of new materials. Suggested methods for implementing additional training of tax-levy staff included a more comprehensive orientation to the Chapter 1 program at the start of the school year, additional on-site workshops provided by program staff, and the possibility of arranging for classroom teachers to attend monthly workshops.

Parent Education and Involvement

Parent education workshops at the central, regional, and school levels were held as proposed. Attendance was generally low, but was found to be higher when meetings were held jointly with other parent meetings, when special events (e.g., a trip to the library, or a student awards assembly) were provided as incentives, and when sites for meetings within a region were rotated each month. Other recommendations offered by program staff for boosting attendance included providing babysitting services and scheduling workshops at the school level on a monthly basis.

Other direct contacts between program teachers and parents were made through the classroom teachers during open-school week and by occasional telephone conversations. Both sets of teachers reported that Chapter I teachers were able to communicate satisfactorily with parents through these methods.

STUDENT ATTENDANCE

In addition to basic tax levy instruction, public school students were scheduled for 45 minutes per day of reading-only Chapter 1/P.S.E.N. services four or five days per week. Those students receiving both reading and math instruction were scheduled for three 45-minute periods per week in each subject. Non-public school students received reading instruction for a minimum of 90 minutes per week. A summary of program instructional time scheduled and sessions attended is presented in Table 1. As the table indicates, students at reading and math sites had higher rates of attendance than those at reading-only sites. For the largest groups served (English-speaking public school students receiving only reading instruction) attendance was slightly higher (81.7 percent) than in the previous cycle (80.0 percent).

STUDENT ACHIEVEMENT

Reading Results

In reading, the program achievement objective for English-speaking students was:

- seventy-five percent will demonstrate normal curve equivalent (N.C.E.) gains between pre-test and post-test as measured by the Metropolitan Achievement Test (M.A.T.).

A program-wide total of 7,741 English-speaking students had scores that could be analyzed in terms of N.C.E. gains. This figure represents 96 percent of all students in this population group served for the full school year. Results indicated that 58.5 percent of the students showed a gain. (See Table 2).

TABLE 1

Chapter 1/P.S.E.N. Sessions Scheduled
and Attended, by Program Component

Component	Number of Students	Average Sessions Scheduled	Average Sessions Attended	
			N	Percent
Component 1:				
English-Speaking Public	10,723	105.0	85.9	81.7
English-speaking Non-public	229	50.1	41.6	83.5
LEP Public	241	109.2	90.6	83.1
Component 2:				
Reading and Math	1,658	139.2	100.6	85.6
Math Only	324	90.6	80.2	87.9

Source: Student data retrieval forms.

- Students attended more than 80 percent of their program sessions.
- Students in Component 2 had the highest rates of attendance.

TABLE 2

Student N.C.E. Gains in Reading
by Test Level

Test Level	N	Percent of Students Showing A Gain
Primary 1	2,912	48.6
Primary 2	1,841	67.0
Elementary	2,023	59.8
Intermediate	894	69.9
Advanced	71	69.0
ALL LEVELS	7,741	58.5

Source: Student data retrieval forms.

- Students tested at the Intermediate level had the highest percentage showing an N.C.E. gain.

It should be pointed out that 1984-85 was the first year in which program teachers used the Reading M.A.T. It was also a transitional year for implementation of the holistic rather than specific skill oriented approach to reading instruction.

O.E.A. conducted an analysis to determine the mean N.C.E. gains by test level, along with their effect size. [1] (See Table 3). The mean N.C.E. gain for the whole group was 4.7, representing a statistically significant improvement ($p<.01$) and a small to moderately meaningful gain, as indicated by the effect size of .31.

Table 4 presents the distribution of English-speaking public school students showing gains by school level. As the table indicates, students at the elementary and intermediate/junior high school level demonstrated the greatest improvement (58.5 and 59.0 percent showed a gain).

O.E.A. performed additional analyses to determine the mean N.C.E. gain of this population group along with their statistical significance and effect size by school level. The results, appearing in Table 5, show that the mean N.C.E. gain (4.69) was statistically signficant, ($p<.01$). In addition, students attending elementary schools had the largest mean N.C.E. gain (5.16 points) and had the most meaningful gains, indicated by the moderate effect size of .34.

---

[1] Effect size (E.S.), developed by Jacob Cohen, is the ratio of the mean gain to the standard deviation of the gain. This ratio provides an index of improvement in standard deviation units irrespective of the size of the sample and therefore gives an indication of how educationally meaningful the improvement was. According to Cohen, 0.2 is a small E.S., 0.5 is a moderate E.S., 0.8 is considered to be a large E.S.

TABLE 3

Significance and Effect Size of
N.C.E. Gains in Reading by Test Level

Level	Number of Students	Mean N.C.E. Gain	Standard Deviation	t	Effect Size
Primary 1	2,912	3.77	18.28	11.1*	.21
Primary 2	1,841	5.96	12.93	19.8*	.46
Elementary	2,023	4.37	12.99	15.1*	.34
Intermediate	894	5.78	12.63	13.7*	.46
Advanced	71	6.58	18.81	3.0*	.35
ALL LEVELS	7,741	4.12	15.23	14.9*	.31

*$p < .01$

Source: Student data retrieval forms.

- The mean N.C.E. gain for all students was statistically significant.
- Students tested at the Primary 2 and Intermediate levels showed the most meaningful gains, which were moderate in effect size.

TABLE 4

Percentage of English-Speaking Public School Students
Showing N.C.E. Gains in Reading by School-Level

School Level	Total Number of Students	Percent of Students Showing Gain
Elementary	4,007	58.5
Intermediate/ Junior High	3,349	59.0
High School	239	53.6
ALL LEVELS	7,595	58.6

Source: English-speaking public school student data retrieval forms.

- The intermediate/junior high school group had the highest percent of students showing an N.C.E. gain.

TABLE 5

Significance and Effect Size of
N.C.E. Gains in Reading by School Level

Level	Number of Students	Mean N.C.E. Gain	Standard Deviation	t	Effect Size
Elementary	4,007	5.16	15.12	21.5*	.34
Intermediate/ Junior High	3,367	4.39	15.45	16.4*	.28
High School	281	2.38	15.22	2.5*	.16
ALL LEVELS	7,741	4.69	15.23	17.1*	.31

*$p < .01$

Source: English-speaking public school student data retrieval forms.

- Students attending elementary schools showed the most meaningful N.C.E. gain.

For the non-public schools component, a total of 146 students had scores for both pre- and post-tests. Of these, 56.8 percent (83 students) showed an N.C.E. gain. Additional analyses revealed that the mean N.C.E. gain for this group was 4.95 points, which represented a statistically significant gain (t=4.6; p<.01) with a moderate effect size of .38.

Reading Results for LEP Students

The program achievement objectives for this group were:

- Eighty percent will master new skills at a rate of two or more skills per 20 sessions attended.
- Thirty percent will master five or more skills per 20 sessions attended as measured by performance on Leamos.

An analysis of the results indicated that 61 percent had mastery rates of at least 2.0 skills in 20 sessions, and six percent had mastery rates of at least five skills in 20 sessions. A full frequency distribution of mastery rates for students tested with Leamos is presented in Table 6. It also indicates that the mean mastery rate for this group as 2.8 (S.D.=2.1). In addition, students tested with Leamos took an average of 2.7 sessions (S.D.=1.8) to master one objective.

Finally, O.E.A. conducted an analysis of the total number of Leamos skills mastered; and a frequency distribution of these results is presented in Table 7. It indicates that over half the students (53 percent) mastered at least nine new skills. In addition, the mean number of Leamos objectives mastered was 11.3 (S.D.=6.1).

Math Results

A total of 1,982 English-speaking public school students received

TABLE 6

Frequency Distribution of Mastery Rates of Leamos Skills

Mastery Rate[a]	Number of Students	Relative Percent	Cumulative Percent
5 or more	6	6	6
4	10	10	16
3	22	22	28
2	23	23	61
1	38	37	98
less than 1	4	2	100
TOTAL	103	100	

Mean=2.8 (S.D.=2.1)

[a]Number of skills mastered per 20 sessions attended.

Source: Spanish-speaking student data retrieval forms.

- Sixty-one percent of LEP students tested with Leamos had mastery rates of at least two skills per 20 sessions attended.

TABLE 7

Frequency Distribution of Total Number of
Leamos Skills Mastered

Number of Objectives Mastered[a]	Number of Students	Relative Percent	Cumulative Percent
25 or more	2	2	2
21 - 24	5	5	7
17 - 20	21	20	27
13 - 16	12	12	29
9 - 12	15	14	53
5 - 8	37	36	89
1 - 4	9	9	98
0	2	2	100
TOTAL	103	100	

[a] Total number of Leamos objectives mastered for full program year.

Source: Spanish-speaking student data retrieval forms.

- More than 29 percent of the population mastered 13 or more new skills during the project year; seven percent of the students mastered at least 21 skills.
- Only 11 percent mastered fewer than five new skills.

instruction in mathematics. Of this number, 1,658 also received reading instruction.

There were two achievement criteria in math, both to be reached by June 30, 1985:

- Eighty percent of the students will master new math skills at a rate of two or more per 20 sessions attended.
- Thirty percent will show mastery rates of five or more per 20 sessions attended.

Achievement was measured by ongoing administration of the Math I.C.R.T. An analysis of the results revealed that both program achievement objectives were accomplished in math. That is, 92 percent of students showed a mastery rate of at least two skills per 20 sessions attended, and 37 percent mastered at least five objectives for every 20 sessions attended. The median mastery rate was 3.16 and the median number of sessions to master one objective was 5.0. A frequency distribution of mastery rates is presented in Table 8.

O.E.A. completed an analysis of the total number of math objectives mastered. A frequency distribution of these results is presented in Table 9. As the table indicates, over three-quarters of the students (77 percent) mastered at least nine new skills. In addition, the mean number of objectives mastered was 13.1 (S.D.=5.8).

Math Achievement by Skill Area. As noted earlier, the Math I.C.R.T. is divided into six skill areas: whole number operations, fractions, decimals and percentages, measurement, geometry, and special topics. Mastery in the first three areas requires a knowledge of mathematical concepts, numeration, arithmetic operations, and problem-solving skills;

TABLE 8

Frequency Distribution of Mastery Rates of Math Skills

Mastery Rate[a]	Number of Students	Relative Percent	Cumulative Percent
5 or more	726	37	37
4	387	20	57
3	396	20	77
2	291	15	92
1	131	6	98
less than 1	51	2	100
TOTAL	1,982	100	

[a]Number of skills mastered per 20 sessions attended.

Source: Component 2 student data retrieval forms.

- Ninety-two percent of the students mastered at least two skills per 20 sessions attended.
- Thirty-seven percent of the students mastered at least five skills per 20 sessions.

TABLE 9

Frequency Distribution of Total
Math Skills Mastered

Number of Objectives Mastered[a]	Number of Students	Relative Percent	Cumulative Percent
25 or more	42	2	2
21 - 24	168	9	11
17 - 20	385	19	30
13 - 16	452	23	53
9 - 12	481	24	77
5 - 8	313	16	93
1 - 4	116	6	99
0	25	1	
TOTAL	1,982	100	

[a] Total number of Math I.C.R.T. objectives mastered for full program year.

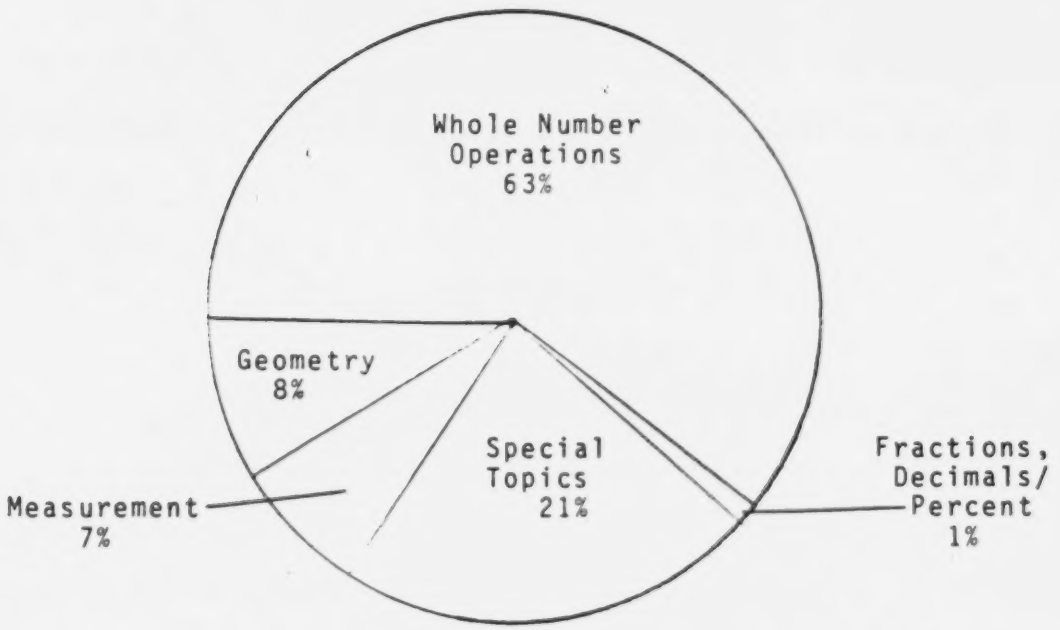
Source: Component 2 student data retrieval forms.

- More than 53 percent of the population mastered 13 or more math skills during the project year; 11 percent of the students mastered at least 21 skills.
- Only seven percent failed to master at least five new skills.

measurement skills include size, length, area, and volume; geometry includes spatial concepts, angles, lines, shapes, and solids; special topics include time, money, Roman numerals, and graphs and tables. Math skill-area mastery was analyzed by calculating the ratio of the number of skills mastered in a particular area over the total number of skills mastered. These results appear in Figure 1. As the figure indicates, approximately three-fifths (63 percent) of all math skills mastered were in the areas of whole number operations and about one fifth (21 percent) were in the area of special topics.

FIGURE 1

Percentage of Math Skills Mastered by I.C.R.T. Skill Area
Among all Math Students



- Three-fifths of the math objectives mastered were in the area of whole number operations.

IV. CONCLUSIONS AND RECOMMENDATIONS

The Division of Special Education's Chapter 1/P.S.E.N. Individualized Reading and Math Services Program provided supplementary remedial reading and math instruction to eligible students in public and non-public schools. Students received individualized instruction from a remediation team consisting of a program teacher and special education classroom teacher. Program teachers used a holistic, meaning-centered approach to reading and emphasized the integration of students' personal experiences with reading and writing. Instruction in math stressed word problems and practical skills.

The target population consisted of 12,381 students in 225 community, special, and non-public schools. Of this total, 10,499 attended regional programs (including 241 in classes for those with limited English proficiency), 1,653 attended low incidence programs in the Citywide Services Unit, and 229 were in non-public schools.

The Office of Educational Assessment conducted an evaluation of the program's implementation and outcome. Analysis of implementation data from program observations, staff interviews, and program records indicated that the program was satisfactorily implemented at all sites visited. Major implementation findings included the following: first, during this transitional year, program teachers at approximately three-quarters of the sites visited were using a holistic approach to reading instruction, representing an increase from the previous cycle, in which field staff documented this approach at about half the sites visited. Second, teachers integrated reading and math instruction through the use

of word problems and by emphasizing practical skills. Third, teachers effectively used a wide variety of instructional materials. Finally, program teachers reported that their own staff development continued to be excellent. While the training special education teachers received was more apparent in classroom practice than in the preceding year, many program and classroom teachers believed that it needed further development.

With regard to program outcome, this was the first year the M.A.T. was used. A total of 7,741 students had scores for both the pre- and post-test. Of these, 58.5 percent showed an N.C.E. gain of at least one point, indicating that the program objective had not been met. Nevertheless, it is important to note that the program was effective in promoting student achievement in reading: the mean N.C.E. gain was 4.7 points, representing a statistically significant ($p<.01$) improvement during a transitional instructional year. Comparison of reading achievement in the present and previous cycles was not possible because of the change from a criterion-referenced to a norm-referenced test.

Teachers assessed the progress of students in the bilingual reading classes through ongoing testing in Leamos. An analysis of the results indicated that 61 percent of the students had a mastery rate of at least two skills, and six percent had a mastery rate of at least five skills.

In math, program teachers measured achievement by ongoing administration of the Math I.C.R.T. Analysis of the results for 1,982 students indicated that 91 percent showed a mastery rate of at least two skills per 20 sessions attended, and 37 percent mastered at least five skills per 20 sessions attended. The overall mean mastery rate was

4.7 (S.D.=4.6). These findings are compatible with those of the previous cycle.

The following recommendations are offered to enhance program implementation and to further promote student gains in achievement.

- Student selection criteria: In order to prevent more effectively the development of later academic difficulties, lower the program eligibility age from nine to seven years;
- Student assessment: Strengthen the assessment process for low functioning readers by using the Metropolitan Achievement Test Primer level; carefully choose the test level to be administered to each participant to assure their ability to discriminate student achievement well.
- Recordkeeping: Eliminate or simplify the use of daily prescriptive logs in order to make more time available for instruction.
- Instructional materials: Acquire more English and Spanish library books, consumable items, high-interest low-level materials, audio-visual aids such as tape read-alongs, and concrete-manipulative materials.
- Staff development: Provide additional pre-service and in-service training for special education classroom teachers through the use of the whole-class model, demonstration lessons nd on-site workshops; for program teachers, offer additional training in bilingual instruction, math instruction, behavior modification, and adaptive skill development; offer periodic staff development opportunities to program coordinators and assistant coordinators through the monthly coordinators' meetings.
- Parent education and involvement: Continue to explore innovative methods for expanding parent involvement in the program, including integrating parent meetings with other school or regional activities (e.g. student awards assemblies).